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ABSTRACT

This study attempted to replicate the findings of Moore, Gagne, and Hauck (1973) and to test the developmental assumption of the two-stage motivational theory proposed by Moore, Means, and Gagne (1972) concerning the effect of combination expectancy-feedback communications. Fourth and second grade subjects were administered five pairs of these communications for one baseline day and four treatment days. The significant expectancy-feedback interaction and fourth grade mean differences support the replicated study. For second graders, positive feedback resulted in best performance levels for both high and low IQ subjects, and high expectancy resulted in best performance within feedback levels. These results both indicate the presence of developmental differences and suggest that second graders only attend to the immediate reward value of adult communications, thus neglecting the cue value (for future success and reinforcement) which such statements convey to forth graders. (Author)

ED 09711

DEVELOPMENTAL DIFFERENCES IN REACTIONS TO COMBINATIONS OF EXPECTANCY AND FEEDBACK STATEMENTS

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Despite the equivocal nature of the majority of research on teacher expectations, recent studies indicate that adult verbal communications to students can have a powerful effect on student performance. This claim had been made for expectancy evaluations by Rosenthal and Jacobson (1966), and supported by the research of Rubovits and Maehr (1961), and Rothbart, Dalfen and Barrett (1971). These studies indicate that manipulation of teacher expectancies result in pupil performance differences which reflect the direction of the manipulated expectancies, and thus suggest that the phenomena in question be labeled "the self-fulfilling prophecy effect."

Attempts to replicate these results by Fielder, Cohen, and Feeney (1971), Claiborn (1969), Jose and Cody (1971), and Fleming and Anttonen (1971) met with failure. As Barber, Calverly, Forgione, McPeake, Chaves, and Bowen (1969) suggest, the deadlock between these two incompatible sets of studies is theoretically not possible in the absence of more precise measurements made with the knowledge of the multiple-step transmission process characteristically followed by expectancy communications. In particular, these studies attempted to manipulate teacher expectancies, but they neither isolated the expectancy communication to observe its direct effect, nor did they provide for reception of the communication by target students.

More recent studies, one by Moore, Means, and Gagné (1972) and another by Moore, Gagné, and Hauck (1973), provide for at least auditory reception of applicable individualized expectancy communications by all Ss, and support a plausible explanation for some of the failures to replicate the findings of Rosenthal and Jacobson. Neither study found a main effect of expectancy, but both found a highly significant interactive effect

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of expectancy-feedback statement combinations and a significant effect of past history as indicated by I. Q. level.

An explanation which appears to account for the data of the two studies, and which may provide an explanation for how a wide range of other motivators work, is the two-stage model presented by Moore, Means, and Gagné, which proposes that:

> 1. Behavior acquired as a function of prior experience, when compared to the requirements of present conditions being experienced, will stimulate an increase in effort directed toward satisfying the present conditions being experienced if: (a) the acquired behaviors and the behaviors to be acquired are associated; (b) the behaviors associated with the present conditions are perceived as not having been achieved; and (c) the behaviors to be acquired are perceived as achievable.
>
> 2. Under conditions where an increase in learner performance is a function of increased effort, reinforcement associated with increased performance will increase the probability that the increase in performance either to achieve, or to avoid the task, will be sustained. The reinforcement of performance resulting from an existing level of effort will result in the maintenance of the existing level of performance. (p. 13)

Thus, expectancy-feedback statement combinations affect performance levels differentially both across and within Ss, according to the past association of a given communication with subsequent reinforcement for a given S. It follows that performance changes reflect the cue value of a given communication, and Ss respond according to the likelihood of future reinforcement rather than to the positive or negative reward-valence of the communication itself.

In attributing present performance differences to differences in past learning, the model assumes developmental differences. Such differences are further indicated by the contrast between the strong self-fulfilling prophecy effect found for first and second-graders by Rosenthal and Jacobson, and the demonstration of a self-defeating prophecy effect for fourth-graders in the Moore, Gagné and Hauck study.

The present study was designed to test the general hypothesis that developmental differences in reacting to expectancy-feedback communications exist, to test the more

pecific hypothesis that such developmental diffe ences reflect the increased attention o the cue-value of evaluative communications irrespective of the actual reward-valence f the communication itself, and, to replicate the findings of the Moore, Gagne, and lauck study.

Method

Subjects

Forty-eight fourth graders and forty-eight second graders, stratified according to IQ and sex, were randomly assigned to one of six treatment conditions from stratifications on the base rate (day 1). Three existing levels (positive, neutral and negative) were combined with two feedback levels (positive and negative) to comprise the six treatments.

The sample was limited to those identified as high achievers to minimize the possible differential effects of motivation. A student was identified as a high achiever if his reading achievement score differed more than one-fourth of a standard deviation above his predicted reading score based on his IQ score. A perfect positive correlation between IQ and reading scores was assumed. Reading scores were obtained for Ss in both grades on the Gates-MacGinntie Reading tests, but different IQ measures were used. Fourth grade IQ scores consisted of previously obtained scores on the Otis-Lennon Mental Ability Test. IQ scores for second graders had not previously been recorded, hence Goodenough-Harris Draw-A-Man test scores were obtained two weeks prior to the experimental stage of the study. From the high achievers, two IQ ranges were determined: Low IQ Ss from 71 to 102, and high IQ Ss from 105 to 139.

Experimenters

Four adults, one female and three males, served as Es. Each E was instructed to be "friendly, but businesslike" toward Ss and practiced procedures before conducting the experiment in order to reduce experimenter differences. Furthermore, the Es were in-

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structed to avoid both paralinguistic (tone of voice) and kinesic (smiling or frowning) communications which Barber and Silver (1968) suggested might be factors in expectancy transmissions.

Procedure

The task was a simple free recall task in which each S looked at a picture of 16 familiar objects for 30 seconds, and then recalled as many of the objects as possible in a one minute period after E removed the picture. Each S saw 26 different pictures during the experiment: one practice picture and five baseline pictures on the first day, followed by five pictures on each of the following four treatment days.

Throughout the experiment, an E met individually with each S in S's school building.

On the baseline day, the E explained the "game" to S and S performed a practice trial. Then S performed five more trials during which he was not given any expectancy or feedback communications by an E. Each S's average performance over the five trials was taken as a baseline measure to be used as a covariate in the data analysis.

On treatment days, S performed for five trials per day each preceded by an expectancy communication and followed by a feedback communication expressed verbally by E. The actual content of these communications was predetermined, according to random assignment to treatment condition, and did not reflect any intended evaluation based on the actual performance level attained by S on a given trial. Expectancy statements were administered just prior to each trial, and included the following:

(1) High Expectancy (HiE)

I think you can do better than most on this one.
I bet you can do very well this time.
I think you can do very well on this one.
I bet you can do better than most this time.

(2) Low Expectancy (LoE)

I don't think you can do as well as most on this one.
I'm not sure you can do very well this time.
I don't think you can do very well this time.
I'm not sure you can do as well as most on this one.

(3) No Expectancy (NoE)

SS in this group were not administered expectancy statements.

Feedback statements were administered immediately after each trial, and included the following:

(1) Positive Feedback (PF)

Yes, you did better than most that time.
Yes, you did very well on that one.
Yes, you did very well that time.
Yes, you did better than most on that one.

(2) Negative Feedback (NF)

No, you didn't do as well as most that time.
No, you didn't do very well on that one.
No, you didn't do as well as most on that one.
No, you didn't do very well that time.

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Each S's average number of correct objects recalled was taken as a measure of performance on each day.

After the completion of the study, Ss were told that they had not always been told the truth about how well they had done, or how well the E thought they might do. As an additional means of relieving any frustrations the Ss might have built up during the course of the experiment, each S was allowed to "punch" the E on the arm if they were still angry at him for the things he had said. Finally, all Ss were thanked for their cooperation and patience during the experiment.

Results

All analyses of the data dealt solely with performance scores: the number of items recalled per card presented, in this case, the average number of items recalled per card for all the cards administered on days 4 and 5.

The planned 3 x 2 x 2 x 2 ANCOVA was rejected in favor of a 3 x 2 x 2 x 2 ANOVA after it was found that the data did not meet the requirement of homogeneity of within-class regression-obtained $F = 2.255 > \text{critical } .95F_{23,48} = 1.75$.

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Insert Table 1 about here
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A summary table of the results of the ANOVA is presented in Table 1. One significant main effect and nine significant interactions were observed. These results are presented in order of increasing complexity, from main effects to the four-way interaction. In each case differences between pairs of means were analyzed by the Newman-Keuls procedure (Winer, 1971). Thus, all possible pairwise comparisons were explored for significant differences wherever a significant effect was observed.

Main Effects

Class was the only significant main effect ($p < .01$). A Newman-Keuls analysis revealed that the mean score of the fourth graders was significantly different from ($p < .05$) that of the second graders. The means for the two classes are shown in Table 2; the fourth grade mean was greater than the second grade mean.

Insert Table 2 about here

Two-way Interactions

Four of the six possible two-way interactions were significant. The effect of the Intelligence x Expectancy interaction was significant ($p < .01$). The means for I x E groups are shown in Table 3. A Newman-Keuls analysis revealed that the mean

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Insert Table 3 about here

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for the HiI-HiE group was significantly different from ($p < .01$) that of the HiI-LoE. Also, LoI-LoE was found to be significantly different from ($p < .05$) the HiI-LoE.

The effect of the Class x Expectancy interaction was significant ($p < .05$). The means for the C x E groups are shown in Table 4. Newman-Keuls analysis revealed that each fourth grade mean

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Insert Table 4 about here

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was significantly different from each second grade mean. The only within class

difference was found for second graders where the HiE group was significantly different from both the LoE ($p<.05$) and the NoE ($p<.01$) group.

The effect of the Class x Feedback interaction was significant ($p<.01$). The means for the C x F interaction are shown

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Insert Table 5 about here

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in Table 5. Newman-Keuls analysis revealed that each mean was significantly different from all smaller means. The fact that the Second-PF group was greater than the Fourth-PF group despite the significant effect of Class suggests that this C x F interaction is an important one, which should be reflected in higher-order interactions.

The effect of the Expectancy x Feedback interaction was significant ($p<.01$). The means for the E x F interaction are

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Insert Table 6 about here

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shown in Table 6. Newman-Keuls analysis revealed that the HiE-NF group mean was significantly different from the means for the NoE-PF ($p<.05$), the NoE-NF ($p<.05$), the HiE-PF ($p<.01$), and the LoE-NF ($p<.01$) groups. Further, LoE-PF was significantly different from LoE-NF ($p<.01$).

Three-way Interactions

All four of the possible three-way interactions were found to be significant, ($p<.01$) in each case. The means for

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Insert Table 7 about here

I x C x E interaction are shown in Table 7. A Newman-Keuls analysis revealed numerous significant mean differences, which are shown in Table 8. For the most part,

the major differences

Insert Table 8 about here

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here are attributable to the effect of Class, since all fourth grade groups were greater than all second grade groups, and only the HiI-HiE second graders were significantly different from but greater than any other second grade groups. Clearly, any within class effects of expectancies across intelligence groups are most likely to be found in the fourth rather than the second grade.

The means for the I x C x F interaction are shown in Table 9.

Insert Table 9 about here

A Newman-Keuls analysis revealed numerous significant mean differences, which are shown in Table 10.

Insert Table 10 about here

Clearly, the differences here reflect the strong C x F interaction discussed previously. The only significant difference between intelligence groups within a given class occurred for fourth graders, for whom NF resulted in better performance for LoI than HiI Ss.

The means for the I x E x F interaction are shown in Table 11.

Insert Table 11 about here

A Newman-Keuls analysis revealed that LoE-NF statements for HiI Ss were clearly the weakest possible performance motivators and resulted in significantly poorer performance ($p<.01$) than all other groups. Additionally, but of questionable importance, the HiI-HiE-NF group was shown to be significantly different from ($p<.05$) the LoI-LoE-NF group. The HiI-HiE-NF mean was greater.

The means for the significant C x E x F interaction are shown in Table 12.

Insert Table 12 about here

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ignificant differences revealed by a Newman-Keuls analysis are shown in Table 13.

Insert Table 13 about here

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hese differences suggest that such lower order interactions as the E x F interaction annot be very accurately interpreted in the absence of a consideration of class level. he orders of E-F combinations for each class are entirely different from the composite rder obtained by analysis of the E x F interaction.

he Four-way Interaction

The effect of the I x C x E x F interaction was highly significant ($p<.01$). he means for this interaction are shown in Table 14.

Insert Table 14 about here

Significant differences between means revealed by a Newman-Keuls analysis are shown in Table 15.

Insert Table 15 about here

Quite clearly all four factors appear to have affected the orderings of group means within this interaction. However, feedback within class appears to have exerted the most major effect. The top five groups received NF, but so did the bottom five groups. he same feedback condition, then, resulted in best performance for fourth graders, and oorest performance for second graders.

Discussion

The results are discussed first in terms of an attempt to replicate the findings of Moore, Gagné, and Hauck (1973); second, in terms of a demonstration of developmental performance differences in reaction to combinations of expectancy and feedback statements; and third, in terms of their theoretical importance and implications for the understanding of adult-child interactions.

Replication

The results clearly replicate the major findings of Moore, Gagné, and Hauck (1973). The main effects of intelligence, expectancy, and feedback, considered separately, were not significant. Thus, the general conclusion of Moore et. al.that "expectancy effects are moderated by both the child's I. Q. level and the feedback being received at present," is supported.

Additional replicative support results from an inspection of differences in treatment group means among fourth grade Ss. For both Hi IQ and Lo IQ Ss the same treatments were found to result in best or poorest performance as those found by Moore, et.al. Best performance for Hi IQ Ss was achieved by those administered combinations of HiE-NF or NoE-NF statements. Poorest performance for the same Ss was achieved by those administered HiE-PF statements. Best performance for Lo IQ Ss was achieved by those administered combinations of LoE-NF statements, and poorest performance by those administered combinations of HiE-PF statements.

Perfect replication was not attained, however. For Lo IQ Ss, Moore et.al. found that the second and third best combinations of E-F statements were NoE-NF and HiE-NF respectively. These results were reversed in the present study. Nevertheless, given the coincidence of the two studies with respect to significant effects and to treatments resulting in best or poorest performance, this difference is not a critical one, since the major implications of both studies for fourth graders depend on these conincident results.

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Developmental Differences

The results clearly indicate the presence of developmental differences. Not only was Class found to have a significant main effect, but also every interaction but one (I x C) involving Class was found to be significant. A simple explanation of the results might be that differences resulted mainly from an increase in some such factor as memory skills which accompanied both increased age and years in school.

Although such a factor probably played a role in determining the results of the present study, the results themselves suggest that some other factor was operative. An inspection of group means within the I x C x E x F interaction reveals clearly different orders of effective treatments for either class within IQ levels.

The second grade Ss performed both differently from and more homogeneously across IQ levels than fourth graders. For both Hi and Lo IQ second graders HiE-PF treatments led to best performance and LoE-NF led to poorest performance. These results are clearly different from those obtained with fourth graders. Two differences appear most striking and pertinent. First, the HiE-PF statements which resulted in best performance for second graders at either IQ level resulted in poorest performance for fourth graders at both IQ levels. Second, the LoE-NF treatment which resulted in best performance for Lo IQ fourth graders resulted in poorest performance for both Lo and Hi IQ second graders. These differences in order of treatment effectiveness, considered in conjunction with the significant C x E x F interaction, demonstrate that some other factor than a simple memory increase with age contributed to the observed developmental differences.

It is possible that feedback was the major contributor to the differences between second and fourth graders. For both second grade IQ levels, the three treatments leading to best performance were all PF conditions, and those leading to poorest performance were all NF conditions. Certainly the fact that each of the means in the C x F interaction was significantly different from all other means in that interaction indicates that feedback played an important role in determining performance

levels of Ss. Perhaps second graders ignore or cannot discriminate expectancy statements, and perform only according to the valence of whatever feedback statements they are administered.

Any explanation which takes all the data into account, however, must assign some, albiet lesser, role to expectancy. Although there were no significant differences among treatments within feedback levels for either Hi or Lo IQ second graders, the greatest numerical performance within these levels was attained by HiE conditions in all four IQ x F breakdowns of the second graders. Furthermore, within the C x E interaction, the mean for the second-HiE group was found to be significantly greater than either the second NoE or the second-LoE group mean. This clearly indicates that at least HiE had an effect on second graders.

Second graders, then, seem to have responded with better performance according to the positive (HiE or PF) content of the E-F communication: the greater the positive content of a given communication, the better the resultant performance. Since all PF conditions resulted in better performance than any NF conditions, regardless of the expectancy transmitted, it appears that feedback was more important than expectancy to the determination of such positive content.

Theoretical Importance

The results are clearly important insofar as they either support or contradict the two-stage model of motivation proposed by Moore, Means, and Gagné (1972). Certainly the results do not appear to contradict the model in question. Rather, the fact that obtained differences were predicted from an analysis of the Moore et.al. model provides support for the model. Further support is provided by the replication of the Moore, Gagné, and Hauck findings for fourth graders, which played a major contributory role to the formulation of the two-stage model.

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Basically, the model attributes present performance differences to past learning. Thus, it assumes developmental differences, but does not specify their exact nature. Some insight into the probable nature of these differences can be attained by comparing the description of second graders' performance in the present study to descriptions of the performance of fourth graders in the Moore, Means and Gagné (1972) and the Moore, Gagné and Hauck (1973) studies.

Differential performances in reaction to E-F communications may reflect differential cue values of expectancy or feedback statements. Thus, NF or LoE might serve as discriminant cues for eventual or highly-likely success in a similar fashion to such unlikely discriminative cues as non-reward (Amsel, 1954) or punishment (Solomon, 1964) in rats. Thus, despite the apparent non-reinforcing value of such communications, they may lead to increased effort and resultant superior performance, due mainly to their relative frequency of association in the past with successful outcomes.

Keeping this point in mind, a possible explanation for the differences between second and fourth graders' reactions to E-F communications is suggested. Briefly, second graders may react mainly to the praise-reward value of a given E-F communication, where reinforcement is supplied solely by the positive valence of the communication. With age and increased classroom experiences, students learn the informational value of E-F communications, which then serve as indicators of how much effort is required for success and whether success is likely in a given situation. This cue learning differs with the IQ level of the student, and with his classroom experiences of success. Thus, by the time that students reach the fourth grade, very different patterns of response to E-F communications are formed depending at least partly on IQ and achievement levels of students involved.

Numerous explanations for such developmenta: differences appear theoretically capable of providing some insight into the actual process by which such differences develop. They might simply be a function of differential experiences with success. Alternatively, some change in cognitive structure, such as generally described by Piaget and Inhelder (1959), might facilitate cue learning or some sort of mediated reinforcement. Certainly fourth grade Ss in this study appeared to have different "deep structures" (Dale, 1972) for the same verbal statements; perhaps a language development mechanism plays some role in determining these developmental differences. Additionally, explanations in terms of cognitive dissonance or arousal might be valuable. However, there seems to be no clear reason to favor any one of these or other possible explanations. Certainly, further research on the development of such differences seems warranted. The use of an objective observation instrument such as that developed by Brophy and Good (1969) for the teacher-child dyadic interaction might be used to check for the effect of classroom experiences with success on such development.

The developmental differences observed in the study have implications for further research, particularly with respect to the further exploration of the findings of Moore et.al. (1973) where an inverse relationship between performance and persistence was observed. Further research, involving the variables considered in this investigation, should be completed utilizing meaningful learning material if the relevance for classroom learning is to be further clarified.

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Summary

The findings of this study provide support for the two-stage model of motivation proposed by Moore et.al. (1972). Further, the findings of this study support the contention that developmental differences in reaction to E - F communications exist, at the very least between second and fourth graders. The data suggest that second graders originally respond only to the reward-value of verbal communication, but learn to respond to discriminative cue properties of such communications by the time they reach the fourth grade.

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Table 1

3x2x2x2 ANOVA Summary

Source	d.f.	SS	MS	F	Significance level
Intelligence(I)	1	.08	.08	.15	--
Class(C)	1	46.20	46.20	88.78	**
Expectancy(E)	2	2.76	1.38	2.67	--
Feedback(F)	1	.12	.12	.23	--
I x C	1	.67	.67	1.28	--
I x E	2	5.95	2.97	5.72	**
I x F	1	1.13	1.13	2.16	--
C x E	2	4.61	2.30	4.43	*
C x F	1	98.82	98.8	189.89	**
E x F	2	13.98	6.99	13.44	**
I x C x E	2	4.94	2.47	4.75	*
I x C x F	1	4.68	4.68	8.99	**
I x E x F	2	6.74	3.37	6.47	**
C x E x F	2	6.58	3.29	6.32	**
I x C x E x F	2	7.38	3.69	7.09	**
Within replicates	72	37.47	.52		
Total	95	242.12			

.05 = *

.01 = **

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Table 2

Performance Means for Classes

Class	
Second	5.192
Fourth	6.579

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Table 3

Performance Means for I x E Interaction

Intelligence	Expectancy	
Hi	Hi	6.262
Hi	Lo	5.350
Hi	No	5.956
Lo	Hi	5.981
Lo	Lo	6.113
Lo	No	5.650

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Table 4

Performance Means for C x E Interaction

Class	Expectancy	
4	Hi	6.563
4	Lo	6.706
4	No	6.469
2	Hi	5.681
2	Lo	4.756
2	No	5.138

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Table 5

Performance Means for C x F Interaction

Class	Feedback	
4	P	5.600
4	N	7.558
2	P	6.242
2	N	4.142

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Table 6

Performance Means for the E x F Interaction

Expectancy	Feedback	
Hi	P	5.681
Lo	P	6.225
No	P	5.856
Hi	N	6.562
Lo	N	5.238
No	N	5.750

Table 7

Performance Means for the I x C x E Interaction

Intelligence	Class	Expectancy	
Hi	4	Hi	6.650
Hi	4	Lo	5.950
Hi	4	No	6.800
Hi	2	Hi	5.875
Hi	2	Lo	4.750
Hi	2	No	5.113
Hi	4	Hi	6.475
Lo	4	Lo	7.462
Lo	4	No	6.138
Lo	2	Hi	5.488
Lo	2	Lo	4.763
Lo	2	No	5.163

Table 8

Newman-Keuls Results for the I x C x E Interaction

	I	C	E	1	2	3	4	5	6	7	8	9	10	11	12
1)	Lo	4	Lo				*	**	**	**	**	**	**	**	**
2)	Hi	4	No							·	**	**	**	**	**
3)	Hi	4	Hi								*	**	**	**	**
4)	Lo	4	Hi									**	**	**	**
5)	Lo	4	No											**	**
6)	Hi	4	Lo											*	*
7)	Hi	2	Hi											*	*
8)	Lo	2	Hi												
9)	Lo	2	No												
10)	Hi	2	No												
11)	Lo	2	Lo												
12)	Hi	2	Lo												

Significant at .05 = *
.01 = **

Table 9

Performance Means for the I x C x F Interaction

Intelligence	Class	Feedback	
Hi	4	P	5.817
Hi	4	N	7.117
Hi	2	P	6.183
Hi	2	N	4.308
Lo	4	P	5.383
Lo	4	N	8.000
Lo	2	P	6.300
Lo	2	N	3.975

Table 10

Newman-Keuls Results for the I x C x F Interaction

	I	C	F	1	2	3	4	5	6	7	8
1)	Lo	4	N		**	**	**	**	**	**	**
2)	Hi	4	N			**	**	**	**	**	**
3)	Lo	2	P						*	**	**
4)	Hi	2	P						*	**	**
5)	Hi	4	P							**	**
6)	Lo	4	P							**	**
7)	Hi	2	N								
8)	Lo	2	N								

Significant at .05 = *
.01 = **

Table 11

Performance Means for the I x E x F Interaction

I	E	F	
Hi	Hi	N	6.813
Hi	Hi	P	5.713
Hi	Lo	N	4.375
Hi	Lo	P	6.325
Hi	No	N	5.950
Hi	No	P	5.963
Lo	Hi	N	6.313
Lo	Hi	P	5.650
Lo	Lo	N	6.100
Lo	Lo	P	6.125
Lo	No	N	5.550
Lo	No	P	5.750

Table 12

Performance Means for the C x E x F Interaction

C	E	F	
4	Hi	N	8.388
4	Hi	P	4.738
4	Lo	N	7.025
4	Lo	P	6.388
4	No	N	7.262
4	No	P	5.675
2	Hi	N	4.738
2	Hi	P	6.625
2	Lo	N	3.450
2	Lo	P	6.063
2	No	N	4.238
2	No	P	6.038

Table 13

Newman-Keuls Results for the C x E x F Interaction

	C	E	F	1	2	3	4	5	6	7	8	9	10	11	12
1)	4	Hi	N		**	**	**	**	**	**	**	**	**	**	**
2)	4	No	N						*	*	**	**	**	**	**
3)	4	Lo	N						*	*	**	**	**	**	**
4)	2	Hi	P									**	**	**	**
5)	4	Lo	P									**	**	**	**
6)	2	Lo	P									**	**	**	**
7)	2	No	P									**	**	**	**
8)	4	No	P									*	*	**	**
9)	2	Hi	N												**
10)	4	Hi	P												**
11)	2	No	N												*
12)	2	Lo	N												

Significant at .05 = *
.01 = **

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Table 14

Performance Means for the I x C x E x F Interaction

I	C	E	F	
Hi	4	Hi	N	8.575
Hi	4	Hi	P	4.725
Hi	4	Lo	N	5.175
Hi	4	Lo	P	6.725
Hi	4	No	N	7.600
Hi	4	No	P	6.000
Hi	2	Hi	N	5.050
Hi	2	Hi	P	6.700
Hi	2	Lo	N	3.575
Hi	2	Lo	P	5.925
Hi	2	No	N	4.300
Hi	2	No	P	5.925
Lo	4	Hi	N	8.200
Lo	4	Hi	P	4.750
Lo	4	Lo	N	8.875
Lo	4	Lo	P	6.050
Lo	4	No	N	6.925
Lo	4	No	P	5.350
Lo	2	Hi	N	4.425
Lo	2	Hi	P	6.550
Lo	2	Lo	N	3.325
Lo	2	Lo	P	6.200
Lo	2	No	N	4.175
Lo	2	No	P	6.150

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Table 15

Newman-Keuls Results for the I x C x E x F Interaction

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1)					**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
2)					*	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
3)					*	*	*	*	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**	**
4)													*	*	**	**	**	**	**	**	**	**	**	**
5)																*	*	**	**	**	**	**	**	**
6)																		*	*	**	**	**	**	**
7)																		*	*	**	**	**	**	**
8)																		*	*	**	**	**	**	**
9)																				*	*	*	**	**
10)																				*	*	*	**	**
11)																					*	*	**	**
12)																					*	*	**	**
13)																					*	*	**	**
14)																					*	*	**	**
15)																							*	**
16)																							*	*
17)																								*
18)																								
19)																								
20)																								
21)																								
22)																								
23)																								
24)																								

Key:

	I	C	E	F
1)	Lo	4	Lo	N
2)	Hi	4	Hi	N
3)	Lo	4	Hi	N
4)	Hi	4	No	N
5)	Lo	4	No	N
6)	Hi	4	Lo	P
7)	Hi	2	Hi	P
8)	Lo	2	Hi	P
9)	Lo	2	Lo	P
10)	Lo	2	No	P
11)	Lo	4	Lo	P
12)	Hi	4	No	P
13)	Hi	2	Lo	P
14)	Hi	2	No	P
15)	Lo	4	No	P
16)	Hi	4	No	N
17)	Hi	2	Hi	N
18)	Lo	4	Hi	P
19)	Hi	4	Hi	P
20)	Lo	2	Hi	N
21)	Hi	2	No	N
22)	Lo	2	No	N
23)	Hi	2	Lo	N
24)	Lo	2	Lo	N

Significant

at .05 = *

.01 = **

END

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